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ABSTRACT

The paper focuses on development and implementation of the curriculum phase of an urban environmental studies program entitled Project Environmental Action Community Education (P.E.A.C.E.) The curriculum model developed for P.E.A.C.E. was based on the premises that it should be created by relevant consumer groups as well as educators, comprehensive in scope, and transferable to other segments of society. Project members generated eight instructional modules, a teacher inservice module and a leadership module. Examples of modules included Urban Environmental Development and Planning, Social Services and the Urban Environment, Economics and Politics of Resource Management, and Leisure Activities in the Urban Environment. The modules were field tested by 24 teachers in 10 urban schools in Memphis (Tennessee). Modules were evaluated by students using various measurement instruments including the Module Activity Questionnaire, the individual module tests, the Environmental Aptitude Scale, the Problem Solving Process Inventory, and the Environmental Action Options Scale. Findings indicated that students enjoyed working with P.E.A.C.E. instructional modules and received higher test scores on seven of the eight modules after participating in the project. Findings also indicated that teachers who participated in P.E.A.C.E. inservice training became more knowledgeable about the module topics, objectives and instructional approaches of the project. (DB)

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INTERRELATIONSHIPS AMONG CURRICULUM
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SCOPE AND OBJECTIVES

Project Environmental Action Community Education (P.E.A.C.E.) was a \$192,000.00 research designed to implement and evaluate an urban environmental education program. University faculty, public school educators, parents, students, and representatives from environmental agencies and the community actively participated in all phases of this program. The specific tasks accomplished in the project are described in the sequence of process objectives that follows: (1) implementation and formative evaluation of the curriculum model used to develop eight learning modules; (2) implementation, revision, and evaluation of the environmental leadership and inservice teacher education modules; (3) implementation, revision, and evaluation of the eight instructional modules; (4) final revision and dissemination of project materials. In this paper, attention will be focused primarily on the development of the curriculum model and the implementation of the instructional modules.

THEORETICAL FRAMEWORK

The curriculum model developed for P.E.A.C.E. was based on three premises. First, it was assumed that the process of curriculum development must involve educators as well as representatives from groups for whom the curriculum is intended. Effective curriculum development needs to be viewed as a system which involves personality structures in social settings as well as subject matter and instructional methodology. Thus, teachers and learners were viewed as an important element in curriculum development.

Second, an effective urban environmental curriculum must be comprehensive in scope. Curricular materials, instructional strategies, and learning modules must be designed to accommodate the interests and needs of relevant consumer groups. Consequently, the curriculum model used in the present study was

designed to maximize its generalizability and transferability. Operationally, the model was intended to be applicable to all segments of our society, taking in account such characteristics as socio-economic, political, cultural, philosophical, and other factors.

Third, it is necessary to identify organizing centers around which instructional strategies and curriculum materials can be organized. Utilizing these fundamental premises, the conceptual framework illustrated in Figure 1 was created.

Figure 1 is a graphic representation of the conceptual framework used to assess the curricular potentialities of environmental education. The three concentric circles identify distinct planes of curriculum operations. Thus, it is acknowledged that there are different levels of decision-making and actions. The elongated arrows extending from the outer circle to the inner circle indicate the temporal relationship among the planes as well as the general direction of evolving activities. These arrows also suggest the interdependence of the decisions and actions at the various levels and point to the focus of all curriculum operations, i.e., teaching-learning interaction. As illustrated, each operational plane is divided into analytically discrete constellations of dynamic variables. The interrupted boundary lines and the two-way connecting arrows denote interactions among subsumed variables as well as whole constellations. Viewed in two dimensions, this conception reveals simultaneous interrelationships and interactions along both horizontal and vertical axes. The complementary interfaces among the components of this total "action system" are indicative of a continuous spiraling sequence of events. Because of the complexities and dynamics of the whole system, intervention at any given point sets into motion a "ripple-effect" that manifests itself in subsequent occurrences. The resulting synergy produces a greater change than the sum of the independent efforts of the separate elements. This holistic conception of reality tends to discredit traditional "black-

I. FOUNDATIONS OF THE CURRICULUM
(Outer Rim)

Knowledge of Environmental Issues
II. CURRICULAR ORGANIZING CENTER
(Second Rim)

Significance Accessibility

III. INSTRUCTION
(Inner Rim)

Teaching-Learning
Interaction

Philosophies
of
Environmental
Education

Scope

Mobility

Social
and
Cultural
Milieu

Developmental
Capacity

Organizing
Capacity

Affective
Orientation
Environment

Cognitive
Levels
of
Learning

Figure 1
Conceptual Framework for Environmental Education

box" paradigms that attempt to describe, explain, and predict curricular phenomena as simple cause-and-effect relationships.

"Teaching-Learning Interaction" appears as the vortex of all curriculum activity in the conceptual framework illustrated in Figure 1. Operationally, this construct is visible in the reciprocal exchanges of cognitive, verbal, and affective behaviors among students and teachers. Underlying personal values and overt communication systems exemplify some of the implicit variables that influence total interaction problems. Concerns at this level of curriculum operation emanated from the following overarching inquiry: Can teaching and learning systems, as defined by Macdonald (1965), adjust sufficiently to maximize positive educative experiences within environmental curricula?

Teachers and school administrators were seen in the present research as having the technical expertise needed to develop a curriculum and translate it into instructional strategies. Therefore, they had the primary responsibility for the development of the environmental education program. Parents, community representatives, and students, on the other hand, possess values and interests which determine the effectiveness and relevance of the learning opportunities contrived by the educators. Consequently, these three groups were actively involved in planning instruction, i.e., establishing objectives, selecting content, and organizing activities. It was the task of the university educators and public school curriculum specialists to facilitate these collaborative efforts.

Eight instructional modules were developed to deal with major environmental issues and problems of concern in Memphis within the curricular framework described earlier. Each of these instructional modules dealt with one of eight themes determined by an interdisciplinary advisory team to be relevant to the urban environmental situation in Memphis. The eight themes identified for the modules focused on environmental development and planning, social

services, aesthetics, resource management, cultural dynamics, environmental ethics, leisure activities, and transportation and communication. These themes were viewed as being easily included within the existing science and social studies curricula of the Memphis City Schools at the junior high school level.

Recognizing the need for an action oriented valuing process in environmental education the model developed by Raths, Harmin, and Simon (1966) was used as one departure point for planning the eight instructional modules. As described by its developers, this model for valuing includes three steps: (1) choosing freely from among alternatives after thoughtful consideration of the consequences of each alternative course of action, (2) public affirmation of the chosen alternative as an indication that the choice is cherished, and (3) doing something repeatedly with the choice in some pattern of life. This model suggests the need for three types of objectives and corresponding learning opportunities. It also suggests a sequence for these types of objectives and opportunities.

Since the first step in the valuing process entails the formulation and evaluation of a course of action, Bloom's (1956) taxonomy of cognitive behavior was used to formulate specific objectives and structure learning activities for the instructional modules. The levels of cognitive behaviors identified by Bloom and his colleagues are organized in the following hierarchy: (1) knowledge (lowest level of cognitive behavior), (2) comprehension, (3) application, (4) analysis, (5) synthesis, (6) evaluation (highest level of cognitive behavior).

Evaluation as defined by Bloom and his colleagues requires that reasons be given for selecting courses of action. For purposes of values clarification, Kohlberg's (1975) scheme of moral reasoning was used as a framework for evaluating and ordering the types of reasons which learners give for a selected course of action. The stages of moral reasoning identified by Kohlberg not only provide a basis for evaluating courses of action selected by a student or

group of students, but also provide a basis for adjusting learning activities to the appropriate educational level of the student.

CURRICULUM-INSTRUCTION INTERFACE

Figure 2 illustrates the interrelationships and interactions among curriculum development and instructional variables in the P.E.A.C.E. research. The criteria used for the formative evaluation of the emergent educational program included (1) relevance, (2) organization, (3) feasibility, (4) applicability, (5) comprehensiveness, (6) generalizability, and (7) transferability.

IMPLEMENTATION PROCESS

Project personnel were organized into ten planning and writing groups. One team, consisting of two teachers and three administrators, developed the Environmental Leadership Module. This module's main emphasis was to train public school administrators in the skills and knowledge necessary to implement and administer an environmental education-action program. The module dealt with the organization of the instructional program; the involvement of parents, community adults, and students both in developing and implementing a program within a local school and as participants in such a program; community relations; program evaluation; and other skills and knowledge to such a program.

A second team, composed of three teachers and one administrator, developed the Teacher Training Module. This module focused on the training of teachers in the skills and knowledge necessary for implementing an environmental education-action program within the framework of an urban community and incorporated within science and social studies curricula at the junior high level.

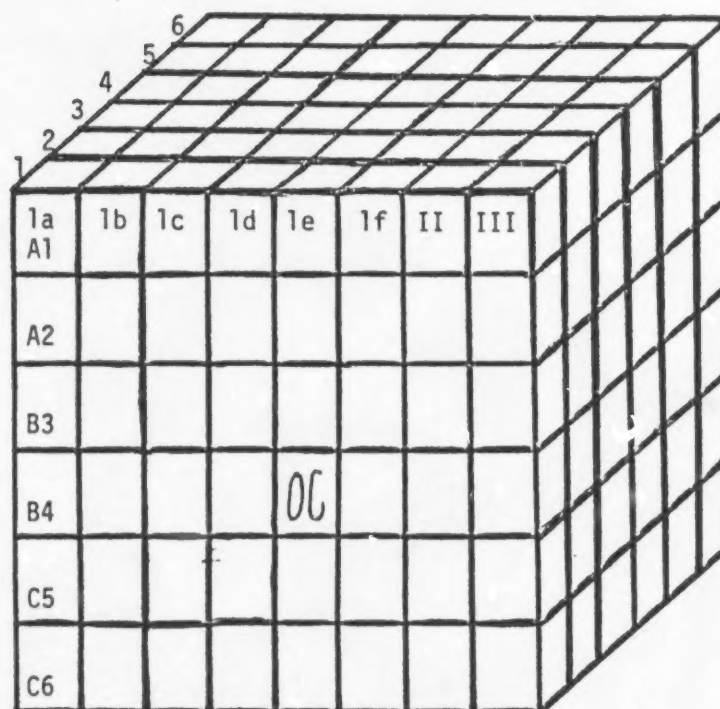
The remaining eight teams, each consisting of three teachers and a Memphis City School curriculum specialist, were assigned one of the following eight themes around which they organized and developed classroom instructional

ENVIRONMENTAL THEMES
(PROJECT P.E.A.C.E.)

1. Urban Development & Planning
2. Social Services and the Urban Environment
3. Aesthetics and the Urban Environment
4. Economics and Politics of the Urban Environment
5. Cultural Dynamics in the Urban Environment
6. Responsible Use of Natural Resources
7. Leisure Activities in the Urban Environment
8. Transportation and Communication and the Urban Environment

Stages of Moral Development
(Kohlberg's Model)

- A. Preconventional Level
 - Stage 1. Punishment/Obedience
 - Stage 2. Instrumental/Relative
- B. Conventional Level
 - Stage 3. Interpersonal Orientation
 - Stage 4. Law and Order
- C. Postconventional Level
 - Stage 5. Legalistic
 - Stage 6. Universal/Ethical



Types of Objectives and Learning Opportunities
(Bloom's Taxonomy)

- I. Choosing
 - a. Knowledge
 - b. Comprehension
 - c. Application
 - d. Analysis
 - e. Synthesis
 - f. Evaluation
- II. Prizing
- III. Acting

Organizing Centers (OC)
(Bennett's Conception)

1. Significance
2. Accessibility
3. Scope
4. Organizing Capacity
5. Mobility
6. Development

FIGURE 2

Matrix of Interrelationships and Interactions Among Curriculum Development and Instructional Variables in Project P.E.A.C.E.

materials. These eight themes were: (1) Urban Environmental Development and Planning, (2) Social Services and the Urban Environment, (3) Aesthetics and the Urban Environment, (4) Economics and Politics of Resource Management, (5) Cultural Dynamics and the Urban Environment, (6) Responsible Use of Natural Resources -- Environmental Ethics, (7) Leisure Activities in the Urban Environment, (8) Transportation and Communication and the Urban Environment.

The activities in the eight instructional modules were designed to include different modes of instruction and levels of knowledge in order that learning experiences would be significant for students of various ability levels. The modules also contained a wide variety of instructional materials and activities -- games, films, field trips, simulations, role-playing, labs, discussions, and use of community resources. These experiences were designed to lead students toward "doing" rather than "talking about" problems in their environment. There was an emphasis on involving significant community resource people in order to encourage more student-adult interaction. Most importantly, the program design was based on the belief that all activities should lead students toward an active role in actually solving some of the significant problems they would encounter.

Each instructional module was designed so that it could be taught independently of the other modules and in any sequence chosen by the instructor. The activities could be self-selected by students or by the instructor in accordance with general curriculum objectives, available resources, and student interests. In addition, they included large and small groups as well as individual learning opportunities.

Under the leadership of the university staff, all participants spent seven hours a day for four weeks during the summer developing materials. The first major task of each team was to develop specific curricular objectives to accomplish the following overarching aims:

1. Implementation of an action-oriented and community-based curriculum project dealing with the preservation and enhancement of environmental quality and ecological balance within an urban area.

2. Utilization of the junior high school science and/or social studies curriculum framework for increasing awareness in the total community that the need exists for immediate solutions to and long-range planning for environmental problems unique to urban settings.
3. Education of citizenry in process of problem solving and of making intelligent value choices that can be translated into courses of action.
4. Development of intelligent strategies and actions for solving specific urban environmental problems.
5. Achievement of a fuller understanding of the urban environment, problems that confront it, the interrelationships between the community and surrounding land and opportunities for the individual to be effective in working toward the solution of urban environmental problems.

As these aims indicate, the problem solving process was the implicit focus around which instructional materials were designed. The following general objectives for achieving the overarching aims were developed:

1. The students will have knowledge of and be able to apply the problem-solving process to environmental issues.
2. The students will be aware of environmental issues and work to a solution of at least two.
3. The students will be able to apply the valuing processes in the analysis of urban environmental issues.

Specific core objectives also were developed for the eight instructional modules, as follows:

1. The student will be aware of the contents of each module and will:
 - a. be able to define and describe a minimum of terminology/ concepts related to this module.
 - b. be able to identify and be involved with at least two agencies connected with this module's topics.
2. The students will become involved with at least one specific problem per module and derive a workable solution to each problem.
3. The students will demonstrate ability to apply valuing processes by stating pros and cons of alternatives of at least one problem explored in the module.

After the aims and objectives for the modules were developed, the teams began designing specific activities. Schools and teachers from the Memphis City Schools were then selected for field-testing the modules. The criteria used in selecting the school sites were as follows:

1. two schools from each of the four administrative areas
2. each school to include grades 7 - 9
3. A variety of physical settings represented among the participating schools
4. school not heavily involved with other experimental programs
5. class sizes average
6. facilities average to slightly above in quality
7. staff open to new ideas but not bandwagon jumpers

Twenty-four teachers and 10 schools were selected to participate in the field-testing. Of the 24 teachers, 12 were selected as a type of control or comparison group who would not receive formal in-service training, but would be given only the written in-service module prior to beginning the field-testing of the instructional modules. The remaining 12 teachers were given a day and a half of in-service training conducted by university personnel one week prior to the beginning of the field test.

During the field-testing of the materials, university personnel made regular visits to all schools for the purpose of observing and assisting teachers in the field-testing. Each participating teacher tested two of the instructional modules over a period of 10 weeks. At the conclusion of the teaching of the first module, another half-day in-service session was held for the teachers as an opportunity for assessing their program and problems encountered.

EVALUATION AND OUTCOMES

Both at the mid-point and at the end of the field-testing of the instructional modules, preliminary and final evaluation workshops were held for the participating teachers, principals, and assistant principals. Each teacher completed a written analysis of the P.E.A.C.E. modules and the implementation process as well as discussed positive aspects and areas of concern regarding this environmental education curriculum.

Instructional Modules

The eight instructional modules were evaluated by students using the Module Activity Questionnaire, the Student Questionnaire, the individual module tests, the Environmental Attitude Scale, the Problem Solving Process Inventory, and the Environmental Action Options Scale. The evaluation strategy for the instructional modules included posttesting with some instruments and pretest-posttest data collection with other instruments. The Module Activity Questionnaire was utilized with students immediately upon completion of specific activities included in the modules. The Student Questionnaire was administered to students at the conclusion of the field test of the instructional modules. The individual module tests were used as pretests and posttests with the students at the beginning and completion of each module. The Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Options Scale were used as pretests and posttests for the entire field test period.

Analyses of Data

The responses of students on the Module Activity Questionnaire are summarized by module and appropriate analyses reported in a series of tables. In Table 1, the data are presented on the number of students participating in each of the activities. The responses revealed that more than half (54%) of the activities were done by students individually. About one fifth of the activities were done by pairs of students. Among the eight modules, a majority of the activities were individualized for six of the modules.

The frequency distributions for the amount of time spent on the individual activities are reported for the eight modules in Table 2. More than two fifths (42%) of the activities were completed in 10 to 19 minutes. More than half of the activities required less than 20 minutes to complete while more than two thirds were done in less than half an hour. While there were some variations in the distributions among the eight modules, the mode for all distributions was 10 to 19 minutes.

Table 1

Frequency Distributions Of Number Of Students Participating In Each Activity
As Reported On The Module Activity Questionnaire

Module	Number of Students in the Activity					Total
	1	2	3-5	6-15	15+	
Urban Environmental Development and	905	139	67	15	36	1,162
Social Services and the Urban Environment	257	172	43	15	2	489
Aesthetics and the Urban Environment	199	14	14	4	13	244
Economics and Politics of Resource Management	622	145	48	28	2	843
Cultural Dynamics and the Urban Environment	703	378	476	59	93	1,709
Responsible Use of Natural Resources-Environmental Ethics	244	133	97	1	1	476
Leisure Activities in the Urban Environment	317	177	312	274	44	1,144
Transportation and Communication and the Urban Environment	162	44	24	3	0	233
Total	3,429	1,200	1,081	399	191	6,300

Table 2

Frequency Distributions Of Amount Of Time Spent On Activities As Reported On
The Module Activity Questionnaire

Module	Minutes Spent On Activity						Total
	9 or less	10 - 19	20- 29	30- 39	40- 49	50 or more	
Urban Environmental Development and Planning	176	507	212	145	34	104	1,178
Social Services and the Urban Environment	104	170	78	62	22	46	482
Aesthetics and the Urban Environment	29	91	58	23	28	17	246
Economics and Politics of Resource Management	96	390	127	94	31	91	829
Cultural Dynamics and the Urban Environment	206	777	239	154	224	51	1,651
Responsible Use of Natural Resources-En- vironmental Ethics	48	139	88	60	26	112	473
Leisure Activities in the Urban Environment	114	467	139	204	130	92	1,146
Transportation and Com- munication and the Urban Environment	23	61	43	25	20	61	233
Total	796	2,602	984	767	515	574	6,238

The data and analyses are summarized in Table 3 for the students' responses on understanding of the objectives of the module activities. Based on a maximum possible score of 10, the means for the eight modules ranged from 7.79 to 9.47. Seven of the means were at least 8.65 or greater in magnitude. The obtained means were compared with the mid-point of the response scale (5.50) using the t-test technique. The results of these analyses revealed that all module means were positive to a highly significant degree.

Table 4 contains the summary of the data and analyses for the item dealing with the understanding of instructions for the activities. Compared to a possible score of 10, the module means varied from a low of 8.23 to a high of 9.49. Means for half of the modules were greater than 9.00. The t-test comparisons of the module means with the scale mid-point of 5.5 showed that the mean for each module was very significantly positive.

The summary of the data and analyses for the item on quality of work done in the activities is depicted in Table 5. The means for the eight modules ranged from 7.93 to 9.38 on the ten-point rating scale. With the exception of one module, the means exceeded 8.00 in magnitude. The results of the t-test comparisons of the module means with the mid-point of the response scale indicated that all module means were positive to an extremely significant extent.

The students' responses on the level of interest of the module activities are summarized in Table 6. Based on a ten-point response scale, the means for the modules varied from a low of 7.59 to a high of 9.00. Except for the two extreme values for the module means, the means were within the range of 8.00 - 8.99. The t-test analyses revealed that all module means exceeded the scale mid-point of 5.5 to a degree which was highly significant statistically.

The data analyses for the responses to the Student Questionnaire are presented in Table 7 for seventh grade students, Table 8 for eighth grade students, and Table 9 for ninth grade students. The means for the eight items on the instrument revealed that the seventh grade students reacted very positively to

Table 3

Summary Of Data And Analyses For The "Understanding Of Objective" Item On
The Module Activity Questionnaire

Module	N	Mean	S.D.	t*
Urban Environmental Development and Planning	1,166	9.47	1.24	109.33
Social Services and the Urban Environment	489	8.90	1.84	40.86
Aesthetics and the Urban Environment	239	7.79	2.42	14.63
Economics and Politics of Resource Management	847	8.79	1.89	50.66
Cultural Dynamics and the Urban Environment	1,743	8.90	1.77	80.20
Responsible Use of Natural Resources-Environ- mental Ethics	481	9.15	1.65	48.52
Leisure Activities in the Urban Environment	1,148	8.70	1.83	59.25
Transportation and Communi- cation and the Urban Environ- ment	233	8.65	1.99	24.16

* $t = \pm 1.98$, $df = 120$ or greater, level of significance = .05 $H_0: U = 5.50$ (mid-
point of response scale)

Table 4

Summary Of Data And Analyses For The "Understanding Of Instructions" Item
On The Module Activity Questionnaire

Module	N	Mean	S.D.	t*
Urban Environmental Development and Planning	1,175	9.49	1.16	117.90
Social Services and the Urban Environment	488	9.23	1.45	56.83
Aesthetics and the Urban Environment	242	8.23	2.27	18.71
Economics and Politics of Resource Management	842	8.92	1.89	52.51
Cultural Dynamics and the Urban Environment	1,744	9.06	1.60	92.92
Responsible Use of Natural Resources-Environ- mental Ethics	476	9.47	1.28	67.67
Leisure Activities in the Urban Environment	1,142	8.83	1.73	65.05
Transportation and Communi- cation and the Urban Environ- ment	234	8.65	2.04	23.62

* $t = \pm 1.98$, $df = 120$ or greater, level of significance = .05 $H_0: \mu = 5.5$ (mid-point of response scale)

Table 5

Summary Of Data And Analyses For The "Quality Of Work" Item On The Module

Activity Questionnaire

Module	N	Mean	S.D.	t*
Urban Environmental Development and Planning	1,175	9.38	1.15	115.65
Social Services and the Urban Environment	489	8.43	1.85	35.02
Aesthetics and the Urban Environment	242	7.93	2.14	17.66
Economics and Politics of Resource Management	838	8.63	1.80	50.34
Cultural Dynamics and the Urban Environment	1,746	8.85	1.75	79.99
Responsible Use of Natural Resources-Environmental Ethics	472	9.13	1.53	51.55
Leisure Activities in the Urban Environment	1,147	8.43	1.91	51.95
Transportation and Communication and the Urban Environment	233	8.15	12.08	19.45

*t=± 1.98, df= 120 or greater, level of significance = .05 Ho:U= 5.5 (mid-point of response scale)

Table 6

Summary Of Data And Analyses For The "Level Of Interest" Item On The Module
Activity Questionnaire

Module	N	Mean	S.D.	t*
Urban Environmental Development and Planning	1,167	9.00	1.88	63.60
Social Services and the Urban Environment	484	8.61	2.13	33.12
Aesthetics and the Urban Environment	239	7.59	2.64	12.24
Economics and Politics of Resource Management	836	8.25	2.50	31.81
Cultural Dynamics and the Urban Environment	1,703	8.09	2.65	33.96
Responsible Use of Natural Resources-Environ- mental Ethics	471	8.77	2.09	33.96
Leisure Activities in the Urban Environment	1,149	8.20	2.33	39.28
Transportation and Communi- cation and the Urban Environ- ment	233	8.14	2.23	18.07

*t=± 1.98, df= 120 or greater, level of significance = .05 Ho:U= 5.50 (mid-point of response scale)

Table 7

Summary Of Data And Analyses For Responses Of Seventh Grade Students On The
Student Questionnaire

(N = 119)

Item	Mean	S.D.	t*
1. Variety of activities included in P.E.A.C.E.	7.99	2.47	11.00
2. Freedom to choose activities to do in P.E.A.C.E.	8.52	2.31	14.26
3. Chance to do some P.E.A.C.E. activities individually and in small groups	8.60	2.08	16.26
4. Importance of what is learned in P.E.A.C.E.	8.32	2.27	13.55
5. Amount of learning that takes place in P.E.A.C.E.	8.67	1.71	20.22
6. Helpfulness of the teacher in doing P.E.A.C.E. activities	8.07	2.51	11.17
7. Interest level of P.E.A.C.E. activities	8.27	2.27	13.31
8. Preference for P.E.A.C.E. compared to regular courses in school	8.46	2.37	13.62

*t=+ 1.98, df= 118, level of significance = .05 Ho:U= 5.5

Table 8

Summary Of Data And Analyses For Responses Of Eighth Grade Students On The
Student Questionnaire

(N = 201)

Item	Mean	S.D.	t*
1. Variety of activities included in P.E.A.C.E.	8.07	2.05	13.68
2. Freedom to choose activities to do in P.E.A.C.E.	8.95	1.87	20.13
3. Chance to do some P.E.A.C.E. activities individually and in small groups	8.77	1.82	19.60
4. Importance of what is learned in P.E.A.C.E	8.42	2.03	15.69
5. Amount of learning that takes place in P.E.A.C.E.	8.18	2.35	12.44
6. Helpfulness of the teacher in doing P.E.A.C.E. activities	8.26	2.55	11.81
7. Interest level of P.E.A.C.E. activities	8.21	2.30	12.85
8. Preference for P.E.A.C.E. compared to regular courses in school	8.31	2.35	13.04

*t = 1.97, df = 200, level of significance = .05 Ho:U = 5.5

Table 9

Summary Of Data And Analyses For Responses Of Ninth Grade Students On The
Student Questionnaire

(N = 175)

Item	Mean	S.D.	t*
1. Variety of activities included in P.E.A.C.E.	8.15	1.99	14.53
2. Freedom to choose activities to do in P.E.A.C.E.	9.01	1.56	24.54
3. Chance to do some P.E.A.C.E. activities individually and in small groups	8.64	1.89	18.12
4. Importance of what is learned in P.E.A.C.E.	8.06	2.11	13.24
5. Amount of learning that takes place in P.E.A.C.E	7.81	2.43	10.37
5. Helpfulness of the teacher in doing P.E.A.C.E. activities	8.13	2.37	12.93
7. Interest level of P.E.A.C.E. activities	7.49	2.47	8.79
3. Preference for P.E.A.C.E. compared to regular courses in school	7.34	3.03	6.62

*t=+1.97, df= 174, level of significance = .05 Ho:U= 5.5

the P.E.A.C.E. instructional modules. Based on a ten-point rating scale, the item means ranged from 7.99 to 8.67. In comparison to the seventh grade students, a similar pattern with slightly higher means was found among the eighth grade students where the item means varied from 8.07 to 8.95. The most diverse pattern of means was evident among the ninth grade students with the range being from 7.34 to 9.01. The t-test comparisons of the item means for the separate grade groups using the .05 level of significance revealed that all means were significantly greater than 5.5, the mid-point of the rating scale.

Although the students at each grade level gave significantly high ratings to all of the items on the Student Questionnaire, the means for some items showed similarities across the grades while other item means indicated considerable variation. Similar ratings were obtained for the items dealing with the variety of activities, the opportunity to do activities individually and in small groups, and helpfulness of the teacher in doing the activities. The eighth and ninth grade students tended to give higher ratings than the seventh grade students did for the item related to the freedom to choose activities. The ninth grade students generally gave lower ratings than the other two grade groups did to the items concerned with importance of what was learned, the interest level of the activities, and preference for the activities as compared to regular courses in school. As the grade level increased, the mean decreased for the item pertaining to the amount of learning that takes place through the activities.

The assessment of the cognitive effect of the modules was determined by analyzing the change scores (posttest score minus pretest score) of the students who used each module. The results of these analyses are reported in Table 10. Among the five ten-item tests, the change score means ranged from .64 to 1.96. The change score means for the two nine-item tests were .48 and 1.16 while the change score mean for the six-item test was .23. The t-test analyses comparing

the change score means with a hypothesized mean of 0 revealed that the increases were statistically significant for seven of the eight modules. While the change was positive for the leisure activities module, it did not achieve statistical significance.

The pretest, posttest, and change score means and change score analyses are depicted in Table 11 for the Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Options Scale. The possible score range for the three instruments are 20-100, 0-18, and 2-12, respectively. The pretest and posttest means for the Environmental Attitude Scale indicated that the means were slightly greater than the mid-point (60) of the potential score range. The relatively small negative change score mean of .92 was statistically significant at the .05 level. While the means were relatively low for the Problem Solving Processes Inventory, the very small change score mean of .08 was not significant statistically. The means for the Environmental Action Options Scale, which were approximately the median of the possible score range, showed a small negative change that was statistically insignificant.

SUMMARY OF FINDINGS

The evaluation of the teacher inservice module suggests that the inservice for P.E.A.C.E. is beneficial to teachers. The results show that the inservice teachers become more knowledgeable about the objectives, module topics, and instructional approaches used in the modules. Only slight increases on measures of these variables are evident among teachers who do not receive the inservice training. The inservice training provided for the teachers is viewed very positively by the participants. Both the content of the inservice activities and the arrangements for the training are regarded favorably.

Table 10

Summary Of Data And Analyses For Change Scores On The Module Tests

Module of Number of Test Items	N	Mean	S.D.	t*
Urban Environmental Development and Planning-10	77	1.53	2.45	5.48
Social Services and the Urban Environment-10	96	1.02	2.61	3.83
Aesthetics and the Urban Environment-10	69	.64	2.55	2.08
Economics and Politics of Resource Management-10	51	1.95	2.27	6.17
Cultural Dynamics and the Urban Environment-10	84	.86	2.01	3.92
Responsible Use of Natural Resources-Environ- mental Ethics-9	138	.48	2.51	2.25
Leisure Activities in the Urban Environment-6	64	.23	2.09	.88
Transportation and Communi- cation and the Urban Environ- ment-9	37	1.16	2.17	3.25

* $t = \pm 2.03$, $df = 36$, level of significance = .05

$t = \pm 2.01$, $df = 50$, level of significance = .05

$t = \pm 2.00$, $df = 60 - 75$, level of significance = .05

$t = \pm 1.99$, $df = 76 - 105$, level of significance = .05

$t = \pm 1.98$, $df = 106 - 140$, level of significance = .05

Table 11

Summary Of Data And Analyses For Pretest, Posttest, and Change Scores Of
Students On The Environmental Attitude Scale, Problem Solving Processes
Inventory, And Environmental Action Options Scale

(N = 465)

Environmental Attitude Scale

Pretest	Posttest	Change Score Mean	S.D.	t*
66.83	65.91	-.92	7.22	-2.75

Problem Solving Processes Inventory

6.67	6.59	-.08	3.75	-.46
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Environmental Action Options Scale

5.84	5.47	-.37	4.93	-1.62
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*t=± 1.98, df= 120 or greater, level of significance = .05

A general pattern of increased scores is evident for inservice teachers and control teachers on measures of environmental attitude, problem solving processes knowledge, and moral reasoning as applied to environmental problems. However, the changes typically are not statistically significant. The scores of the two groups of teachers are highly comparable at the end of the field test of the modules.

The leadership module appears to improve school administrators' knowledge of module topics and instructional strategies although the changes are not statistically significant for the small number of participants during the short time period of the leadership training. The administrators react very positively to the leadership inservice. The favorable reactions relate to the substance and conduct of the activities as well as the arrangements for the inservice training. The change in attitude toward the environment is insignificant statistically.

The assessment of the instructional modules by students reveals positive results with respect to several areas. The cognitive assessment indicates that the modules are effective in improving students' knowledge of terminology presented in the modules. Change in comprehension of the steps in selected problem solving processes is insignificant. While change in values related to environmental problem solutions is not significant, attitudes toward the environment appear to be negatively affected.

The reactions of students to the modules are highly positive. The students react favorably to factors such as the freedom to choose activities, the opportunity to study individually and in small groups, the importance of the learning promoted by the modules, and the helpfulness of their teachers. The responses concerning the specific activities are also very positive. Most activities are completed in less than half an hour. The students view the activities as having clearly stated objectives and instruction, promoting high quality of work, and having high interest level for most students.

The overall results of the evaluation indicate that the various modules are effective with teachers, school administrators, and students. Even with the time constraints imposed in field testing the modules, many favorable results were revealed by the evaluative data. A systematic application of the modules during an entire semester or school year could be expected to produce more dramatic impacts on the target audiences.

EPILOGUE

The need to develop environmental curricula and instructional programs with an urban orientation is a pressing one for educators. There is no reason to suppose, for example, that the urban environmental situation has improved or even stabilized since the President's Council on Recreation and Natural Beauty reported in 1968 that, "One of the most ominous threats to the environment lies in the failure of man thus far to provide humane solutions to the problems posed by the spread of his own numbers. No major urban center in the world has yet demonstrated satisfactory ways to accommodate growth." While it would be naive at best to suppose that urban educators should search for and attempt to develop programs for effectively educating urban residents to be able to take intelligent action aimed at dealing with urban environmental problems. Problems related to translating nationally and professionally developed curricula into instructional programs need to be taken into account in suggesting the development of an urban environmental curriculum. Thus, a model for curriculum development is needed which reduces or alleviates problems from the curriculum development itself. This research was aimed at implementing and evaluating a community action educational program dealing with the preservation and enhancement of environmental quality and ecological balance within an urban area.

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